Vanadzor Municipality (Armenia)

One-pager on Street Lighting Projects

(Identification form for municipal project proposals on EE modernization of street lighting[1])

1. Information about municipality	
Name of municipality:	Vanadzor
Region / Oblast:	Lori
Country:	Armenia
Number of citizens:	78700
City budget (most recent year)	4411413 EURO 2308502000 AMD[2]
Website of municipality:	www.vanadzor.am
Member of CoM since:	07.07.2016
Date of SECAP approval:	30.05.2017
Name of contact:	Lilya Davtyan
Position:	Head of Development Program, External Relations and IT Division of the Municipality
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Phone:	+374 60 65 07 27, +374 77 529991

2. SEAP/SECAP Sector	Public Lighting / Street Lighting

3. Description of object	
Parameter	**Street N1**
Street name	Tigran Mets
Classification /category of street[3]	U4
Length of street, m	2100
Width of street, m	18
Sidewalks[4]	Both sides (1.5-2 m length)
Number of lighting points, pcs	118
Distance between lighting poles, m	25-35
Mounting height of a luminaire, m	7-9
Position of luminaries	On both sides opposite to each other
Type of installed lamps	HPS
Capacity of installed lamps, W	250-400
Total installed capacity of street lighting system, kW	38,35
Annual hours of operation of the system, hours	2000
Average illuminance level, lux	
Control system (Yes/No)	Yes
Type of control system (e.g. time relay/lighting sensor)	Time relay
Underground cable wiring (Yes/No)	Overhead
Power metering system (Yes/No)	Yes
Type of power metering system (e.g. two-tariff)	Two-tariff
Short description (conditions of infrastructure, number of non-operated lamps, metering system e.g. individual or combined with other consumers, other information)	The central street of Vanadzor crossing Hayk square. Metering system is not individual.

[1] The information provided with this form is for information purposes only. No rights can be exerted because of information provided with this form, nor can the municipality be held accountable for any mistakes or incorrect information provided within.

[2] Use the exchange rate of your national bank on the moment of filling in the form.

[3] Please refer to relevant laws/norms.

[4] For example: on both sides (1.5-2 m width), or on one side (1.5-2 m width, on the side of lighting poles), or on one side (1.5-2 m width, in front of the lighting poles).

4. Annual energy consumption (MWh/year) and costs over the past 3 years							
Year	Energy consumption (MWh/year)	Energy consumption costs		O&M costs		Total costs per year	
		EUR	AMD	EUR	AMD	EUR	AMD
2016	76.07	4173.50	2184000	401	210,000	4574	2394000
2017	76.07	4173.50	2184000	401	210,000	4574	2394000
2018	76.07	4173.50	2184000	401	210,000	4574	2394000

5. Photos showing pre-project situation (daylight and night time)




6. Available supporting documents (If necessary, provide links or attach copies of documents)

Reference to any available supporting documents like energy audits, feasibility studies, etc.

Document / Source N1: DIALux Lighting Calculation (see attached)

7. Energy efficiency measures and modernizations to be implemented at Street N1					
Energy efficiency measure & modernizations	Number of units	Indicative costs per unit (with VAT)[5]		Subtotal costs	
		EUR	AMD	EUR	AMD
Procurement of street luminaires, pcs.	118	160	84000	18880	9912000
Installation of street luminaires, pcs.	118	23	12000	2697	1416000
Repairmen or replacement of poles, pcs.					
Installation of underground cable, m					
Installation of control boxes, pcs.	2	181	95000	362	190000
Installation of metering system, pcs.	2	124	65000	248	130000
Introduction of dimming system, pcs.					
Complimentary equipment, pcs.					
- brackets	118	19	10000	2248	1180000
- fixing elements	118	1	500	112	59000
Other works (welding)					
TOTAL				**24546.7**	**12887000**

[5] These are indicative costs based on the data from real implemented projects under the Covenant of Mayors – Demonstration Projects (CoM-DeP programme). However, municipalities are advised to contact suppliers / service providers to obtain more accurate information for their specific case / country.

8. Other costs		
Description	**Indicative costs (EUR)**	**Indicative costs (AMD)**
Human resources/PIU	381	200000
Structural study	190	100000
Energy Audit	476	250000
Technical design	952	500000
State expertise	114	60000
Site supervision	571	300000
Installation works (labor)		
Other (please specify)	952	500 000
TOTAL	**3638**	**1910000**

9. Grad total costs	Tigran Mets Avenue
EURO	**28184.7**
AMD	**14797000**

10. Description of system after implementation		
Parameter	**Street N1**	
Street name	Tigran Mets	
Number of lighting points, pcs	118	
Type of new luminaires (e.g. HPS, LED, PV integrated LED)	LED	
Individual capacity of new luminaires, W	76	
Total installed capacity of new street lighting system, kW	8.968	
Average illuminance level, lux	20	
Annual hours of operation of the system, hours	2000	
Annual energy consumption of the system, MWh[6]	17.936	
Annual energy consumption costs, Euro / AMD	1410	739866.5
Annual O&M costs, Euro / AMD	210	110000
Annual energy consumption and O&M costs, Euro / AMD	**1620**	**849866.5**

11. Expected results		
Annual energy savings, MWh[7]	**58.13**	
Annual monetary savings, EUR/local currency	**2954**	**1544133.5**
Annual CO_2 emission reduction[8], tCO_2	**12.9**	

12. Timetable of the project	
Description of step	**Indicative time needed (days)**
Recruitment/Mobilization of IPU	10
Energy audit (drafting ToR, procurement of services, implementation, report)	15
Technical design (drafting ToR, procurement, implementation, report)	10
State expertise	5

[6] In case of PV integrated solar LED street lights that generate electricity to be accumulated in batteries in the daytime and consumed by the lighting system in the nighttime, or to be supplied to a national grid via a net-metering system (bidirectional electricity meters) in the daytime and consumed by the lighting system in the nighttime, only electricity supplied to the lighting system by a national grid or other sources shall be counted.
[7] It is important that you fill in reasonable estimates of energy savings. Too optimistic energy savings will raise questions about your trustworthiness as partner.
[8] For calculation of CO_2 emission reduction, please refer to national GHG emission factors (SECAP Guide).

Procurement	60
Works/site supervision	10
Final acceptance (incl. correction of defects)	10
Calculation of real savings (measurement &verification)	5
TOTAL	**125**

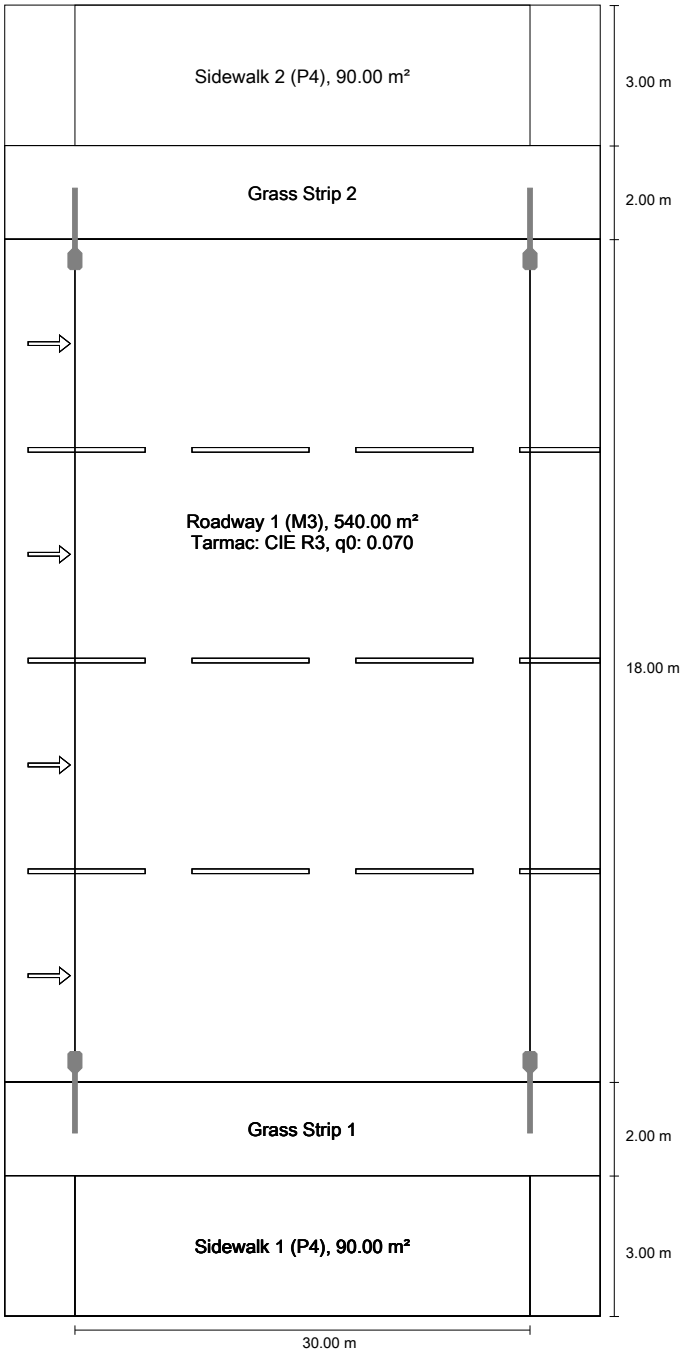
13. Other information

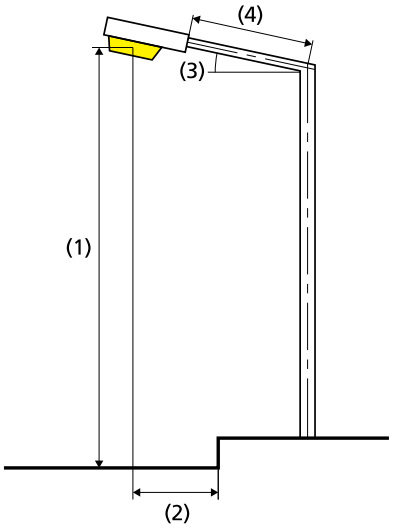
Date:
02.09.2019

Vanadzor light calculation-18road-9poles-30 distance

Street 1 according to EN 13201:2015

DIALux 76 W L01





Lamp:	1x48 LEDs bin N4
Luminous flux (luminaire):	10243.28 lm
Luminous flux (lamp):	10243.00 lm
Operating Hours	
4000 h:	100.0 %, 76.0 W
W/km:	5016.0
Arrangement:	both sides opposite
Pole distance:	30.000 m
Boom inclination (3):	10.0°
Boom length (4):	1.500 m
Light centre height (1):	9.000 m
Light overhang (2):	0.400 m

ULR:	0.00
ULOR:	0.00
Maximum luminous intensities	
at 70° and above	830 cd/klm *
at 80° and above	354 cd/klm *
at 90° and above	13.4 cd/klm *
Luminous intensity class:	/

Any direction forming the specified angle from the downward vertical, with the luminaire installed for use.

* Luminous intensity values in [cd/klm] for calculating luminous intensity class refer to the output flux of the luminaire, according EN 13201:2015.

Arrangement complies with glare index class D.0

Results for valuation fields

Light loss factor: 0.80

Sidewalk 2 (P4)

Em [lx] ≥ 5.00 ≤ 7.50	Emin [lx] ≥ 1.00
✔ 5.44	✔ 2.61

Roadway 1 (M3)

Lm [cd/m²] ≥ 1.20	Uo ≥ 0.40	Ul ≥ 0.70	TI [%] ≤ 15	EIR ≥ 0.30
✔ 1.40	✔ 0.59	✔ 0.73	✔ 10	✔ 0.39

Sidewalk 1 (P4)

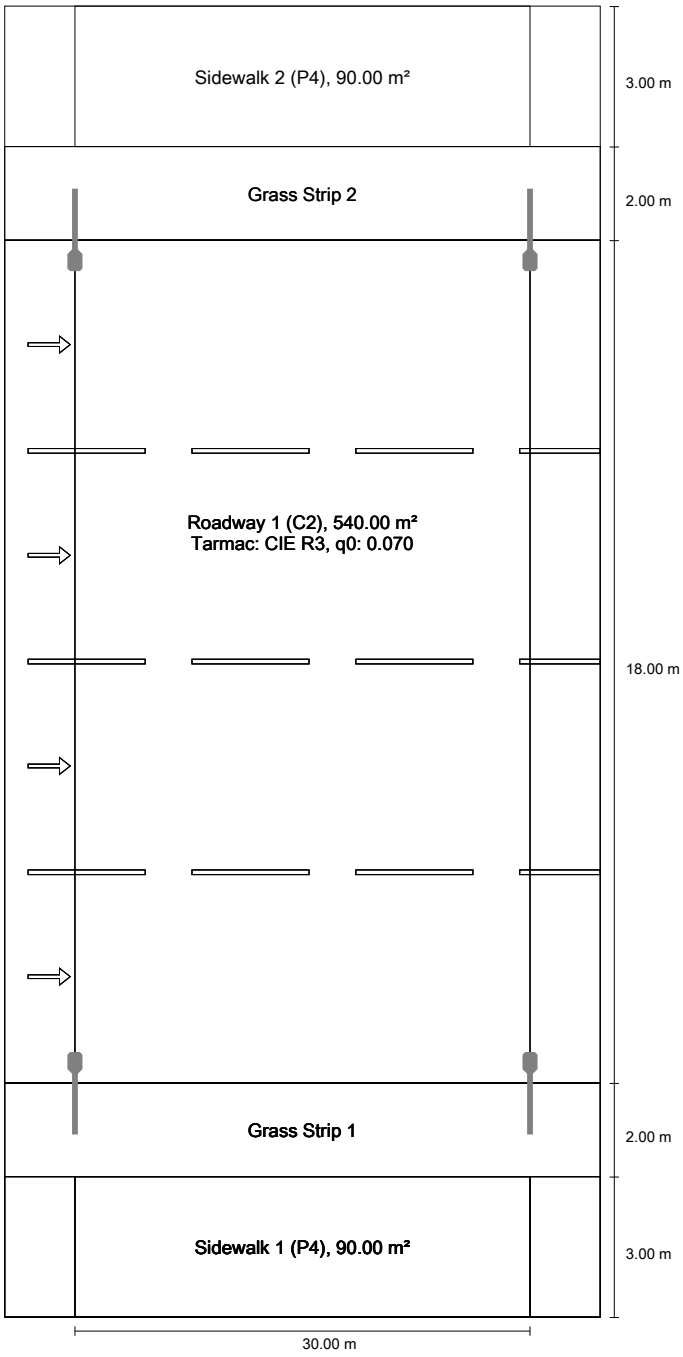
Em [lx] ≥ 5.00 ≤ 7.50	Emin [lx] ≥ 1.00
✔ 5.44	✔ 2.61

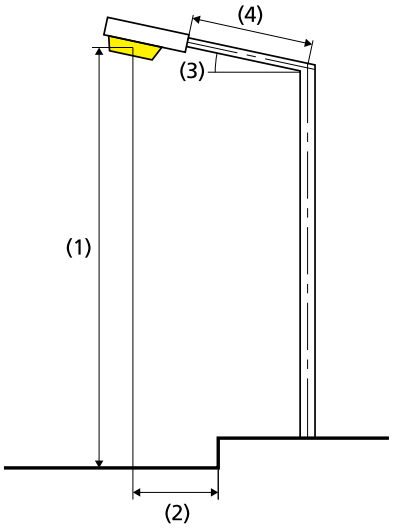
Results for energy efficiency indicators

Power density indicator (Dp)	0.011 W/lxm²
Energy consumption density	
Arrangement: 076 L01 (608.0 kWh/yr)	0.8 kWh/m² yr

Street 2 according to EN 13201:2015

DIALux 76 W L01





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Arrangement complies with glare index class D.0

Results for valuation fields

Light loss factor: 0.80

Sidewalk 2 (P4)

Em [lx] ≥ 5.00 ≤ 7.50	Emin [lx] ≥ 1.00
✔ 5.44	✔ 2.61

Roadway 1 (C2)

Em [lx] ≥ 20.00	Uo ≥ 0.35
✔ 23.32	✔ 0.45

Sidewalk 1 (P4)

Em [lx] ≥ 5.00 ≤ 7.50	Emin [lx] ≥ 1.00
✔ 5.44	✔ 2.61

Results for energy efficiency indicators

Power density indicator (Dp)	0.011 W/lxm²
Energy consumption density	
Arrangement: 076 L01 (608.0 kWh/yr)	0.8 kWh/m² yr